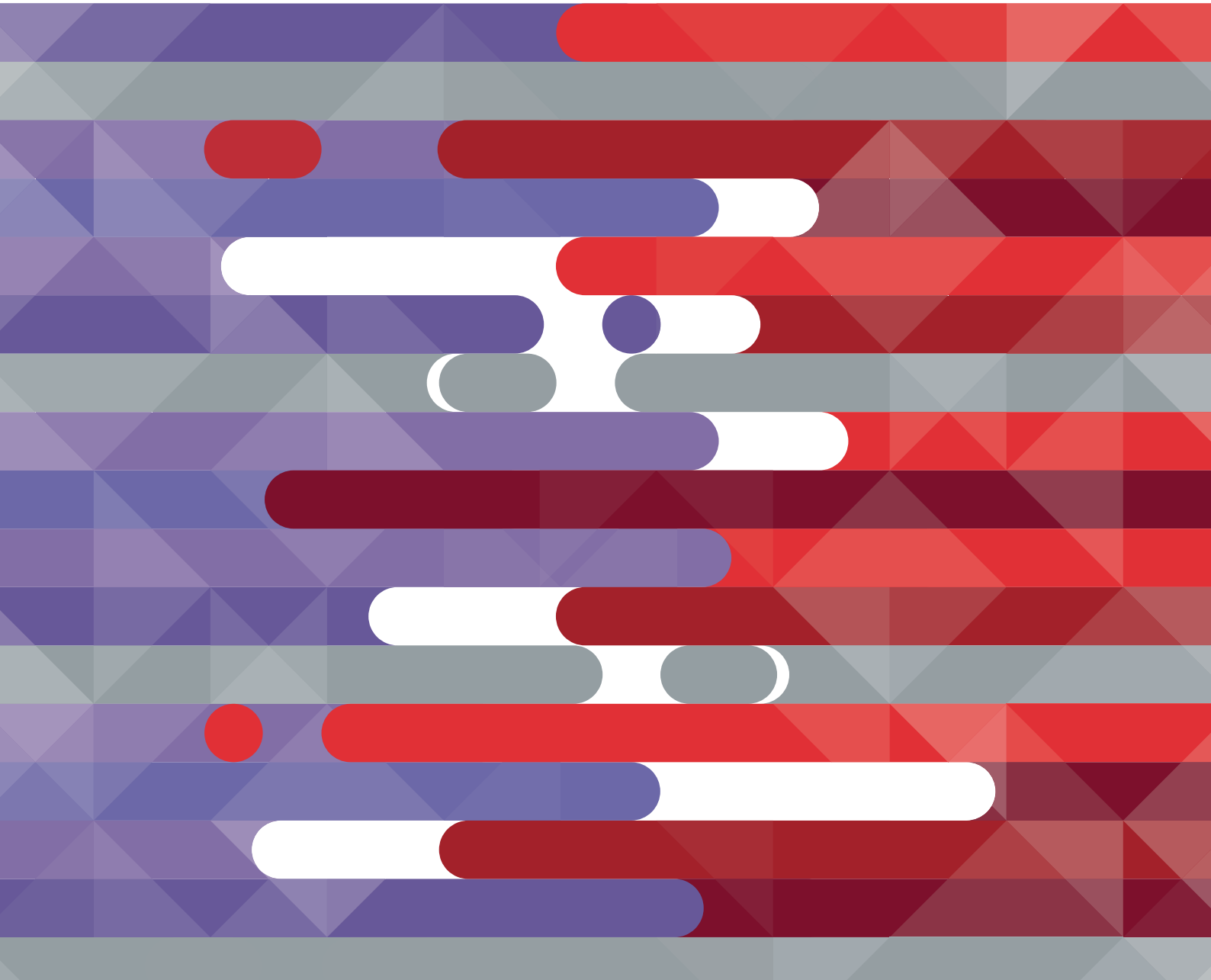
ESMO-MAGNITUDE OF CLINICAL BENEFIT SCALE

Understanding ESMO-MCBS?



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What is the ESMO-MCBS?

Promoting clear and evidence-based communication about the benefit of cancer treatments

In 2015 the European Society for Medical Oncology (ESMO) launched the **ESMO-Magnitude of Clinical Benefit Scale (ESMO-MCBS)**[1, 2, 3] to facilitate improved decision-making regarding the value of anti-cancer therapies, promote the accessibility and reduce iniquity of access to high value cancer treatments.

The ESMO-MCBS was developed to promote the scientific integrity of ESMO and of oncologists to critically evaluate the clinical benefit of cancer therapies reported in clinical trials. In particular, the tool:

Reduces bias in data interpretation and analysis and enhance critical appraisal of clinical trials

Reduces hype

Provides robust validation with strict adherence to standards for “accountability for reasonableness”

Provides reliable and fair evaluation of benefit to assist in cancer planning, value-based priority-setting and impact-oriented resource allocation decisions

[1] Cherny NI, Sullivan R, Dafni U, et al. A standardised, generic, validated approach to stratify the magnitude of clinical benefit that can be anticipated from anti-cancer therapies: the European Society for medical oncology magnitude of clinical benefit scale (ESMO-MCBS). Ann Oncol2015;26:1547–73.
[2] Cherny NI, Dafni U, Bogaerts J, et al. ESMO-Magnitude of Clinical Benefit Scale version 1.1. Ann Oncol 2017;28:2340–66.
[3] Cherny NI, Oosting SF, Dafni U, Latino NJ, Galotti M, Zygoura P, et al. ESMO-Magnitude of Clinical Benefit Scale version 2.0 (ESMO-MCBS v2.0). Ann Oncol 2025;36,8: 866 - 908

Since value is based on considerations of the magnitude of clinical benefit as well as cost and given the challenges to understanding the actual magnitude of the clinical benefit, the ESMO-MCBS was developed as a validated and reproducible scale that is applicable across the full range of solid tumours in oncology, and since 2023 in haematological malignancies. The latter has been developed in collaboration with the European Haematological Association (EHA).

It incorporates a structured, rational and valid approach to data interpretation and analysis that reduces the tendency to have judgements affected by bias or uninformed and/or idiosyncratic data interpretation that has been developed in accordance with the public policy standard of "accountability for reasonableness":

Clinically relevant and reasonable criteria for priorities

Coherence

Wide applicability

A transparent process of development with scope for peer review, appeal and revision

Statistical validity

It is a dynamic tool, and its criteria are revised on a regular basis, to address the rapid evolving landscape of new treatments development and regulatory decisions. The ESMO-MCBS was revised in 2017 **(version 1.1)** and in 2025 **(version 2.0)**, based on feedback and queries from clinicians, patients, researchers and representatives of the pharmaceutical industry, and a dynamic process of internal peer review.

The ESMO-MCBS is intended to both assist oncologists in explaining the likely benefits of a particular treatment to their patient as well as to aid public health decision makers to prioritise therapies for reimbursement. The scores are currently incorporated in the **ESMO Clinical Practice Guidelines**, when applicable, and used as part of Health Technology Assessment (HTA) processes in many countries.

Scoring Criteria & Methodology

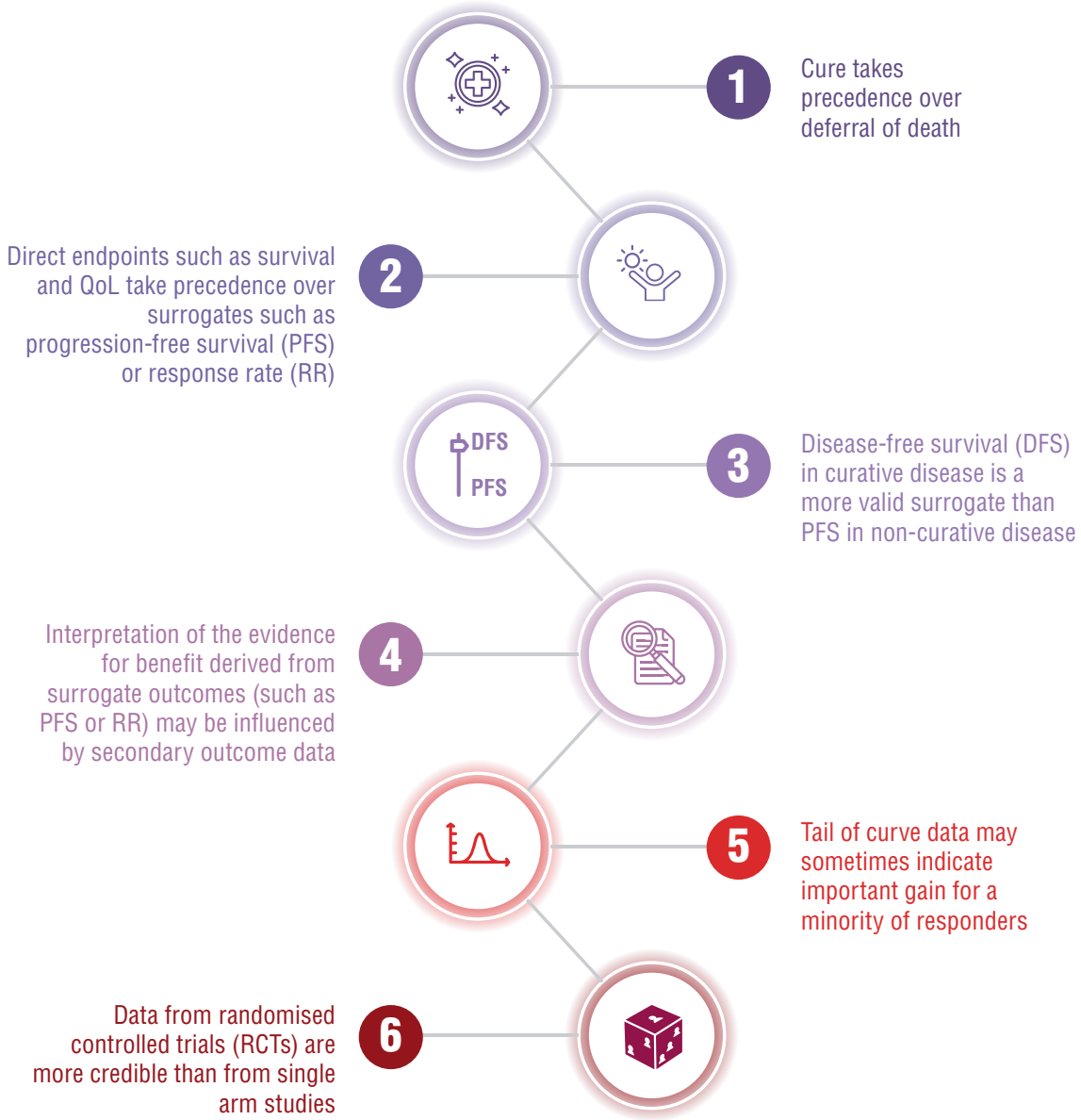
Scoring criteria according to clinical settings

The ESMO-MCBS grading highlights those treatments which substantially improve the duration of survival and/or the quality of life (QoL) of patients with cancer and aims to distinguish them from trials demonstrating more limited and sometimes even marginal benefits. The ESMO-MCBS assigns categorical benefit scores to European Medicines Agency (EMA) and US Food and Drugs Administration (FDA) approved cancer treatments, based on results from 'positive' randomised clinical trials:

1. **superiority trials** that have demonstrated a statistically significant result for the primary endpoint of the study, and/ or secondary in case of overall survival and
2. **non-inferiority trials**, reaching a conclusion of non-inferiority.

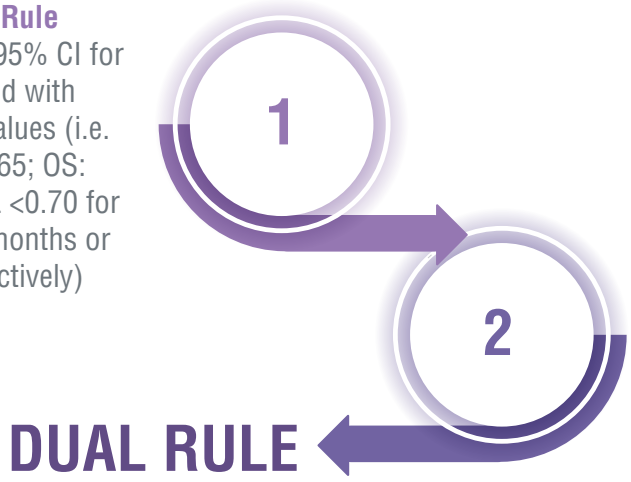
The ESMO-MCBS also includes scales to evaluate the benefit of cancer treatments as assessed in **single-arm clinical trials** and can also be applied to **robustly performed meta-analyses**.

There are 6 underlying premises to score a medicine using the ESMO-MCBS:



The goal of the ESMO-MCBS evaluation is to assign the highest grade to trials having adequate power for a relevant magnitude of benefit, and to make appropriate grade adjustment to reflect the observed magnitude of benefit. To achieve this goal, a dual rule has been implemented:

Relative Benefit Rule
The lower limit of the 95% CI for the HR is compared with specified threshold values (i.e. PFS: LL95% CI <0.65; OS: LL95% CI <0.65 or LL <0.70 for median control <12 months or >12 months, respectively)



Absolute Benefit Rule
The observed absolute difference in median treatment outcomes is compared with the minimum clinical significant absolute benefit

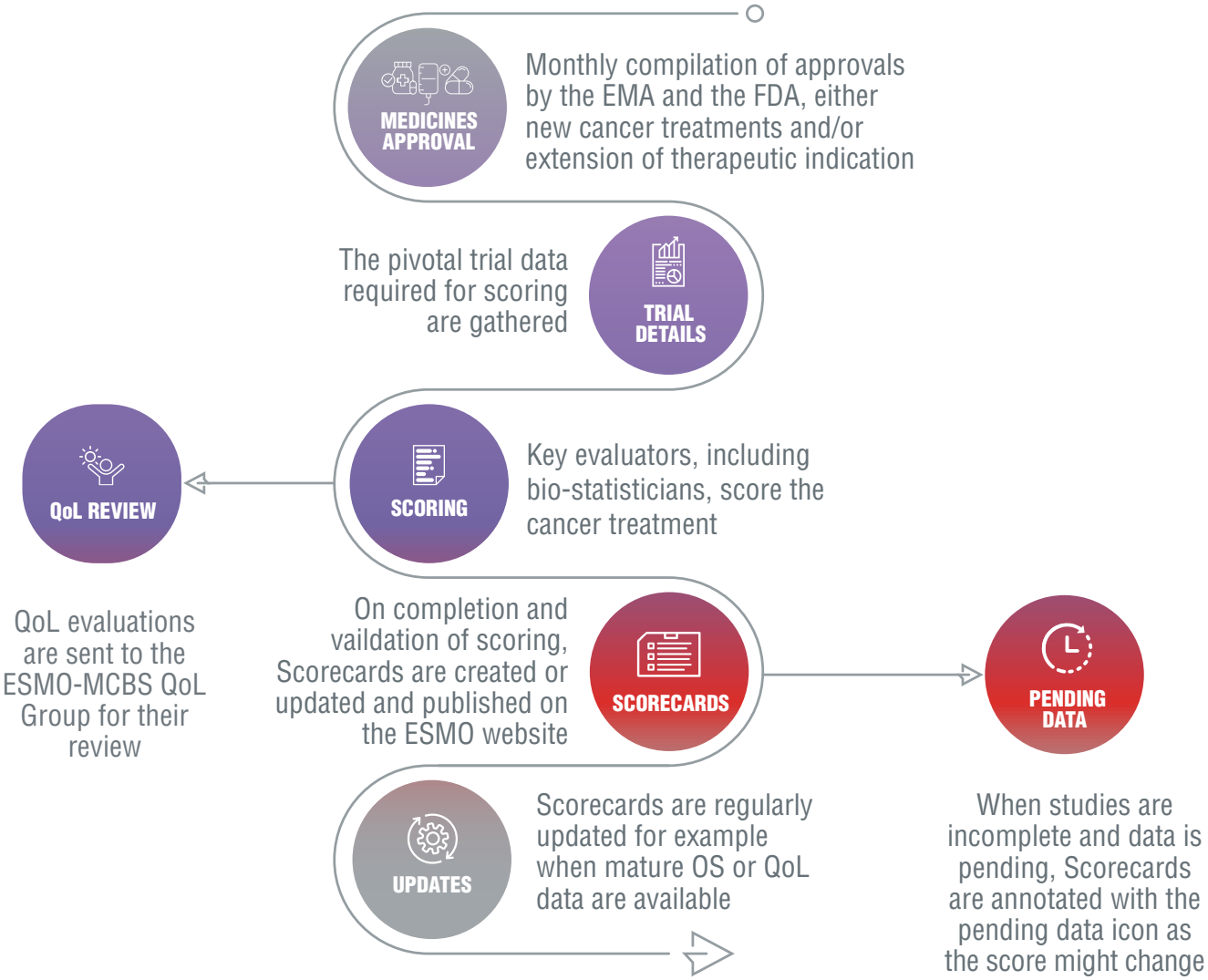
The ESMO-MCBS is based on the concept that potential benefits of a new treatment are not only to live longer, reflected by improved OS, or surrogates such as DFS or PFS when validated, but also to live better, reflected by improved QoL or reduced toxicity compared to the previous standard of care. There are different settings in which QoL can determine the final ESMO-MCBS score.

- For new adjuvant or potentially curative therapies the combination of non-inferior OS or DFS with improved QoL results in a grade B (form 1a).
- New treatment approaches not likely to be curative with OS or PFS as the primary endpoint receive a preliminary score based on OS or PFS benefit and are credited with an upgrade of 1 point if QoL is improved (forms 2a and 2b). Scores generated on PFS may also be downgraded in cases where there is no survival advantage with mature data and where QoL evaluation has not demonstrated any significant and clinically meaningful benefit.
- Furthermore, in non-inferiority studies with non-curative treatments that demonstrate reduced toxicity or improved QoL approaches that can receive a grade 4 and OS or PFS is at least non-inferior to the previous standard of care and a grade 3 if there is improvement in some pre-specified symptoms but not in overall QoL (form 2c).
- Finally, for single-arm studies for orphan diseases or situations with a high unmet need, the preliminary score that is based on PFS or overall response rate can be upgraded by 1 point if there is an improvement in QoL (form 3).

Given the importance of QoL for the final ESMO-MCBS score, a **checklist** to guarantee that QoL data meet adequate methodological and reporting standards to justify an impact on ESMO-MCBS scoring was developed in collaboration with the European Organisation for Research and Treatment of Cancer (EORTC). The checklist is applicable in the scoring of solid tumours and haematological malignancies.

Scoring methodology

ESMO-MCBS scores are based on peer reviewed clinical trial reports or meta-analyses and should be interpreted in the context of an evolving treatment landscape, in connection with clinical practice guidelines. The scores are generated using a validated standard methodology and are reviewed by a team of clinicians and statisticians before publication – an overview of the scoring methodology is reported below.



Where to find the ESMO-MCBS scores?

Cancer treatments approved by the EMA or FDA and scored by ESMO are gathered in two online repositories – one for treatments in solid tumours and one for those used in haematological malignancies: the ESMO-MCBS Scorecards.

These repositories are searchable portals that allows users to filter treatments by therapeutic class, name, indication or score and it contains more than 520 and 110 treatments in solid tumours and haematological malignancies respectively, scored by ESMO.

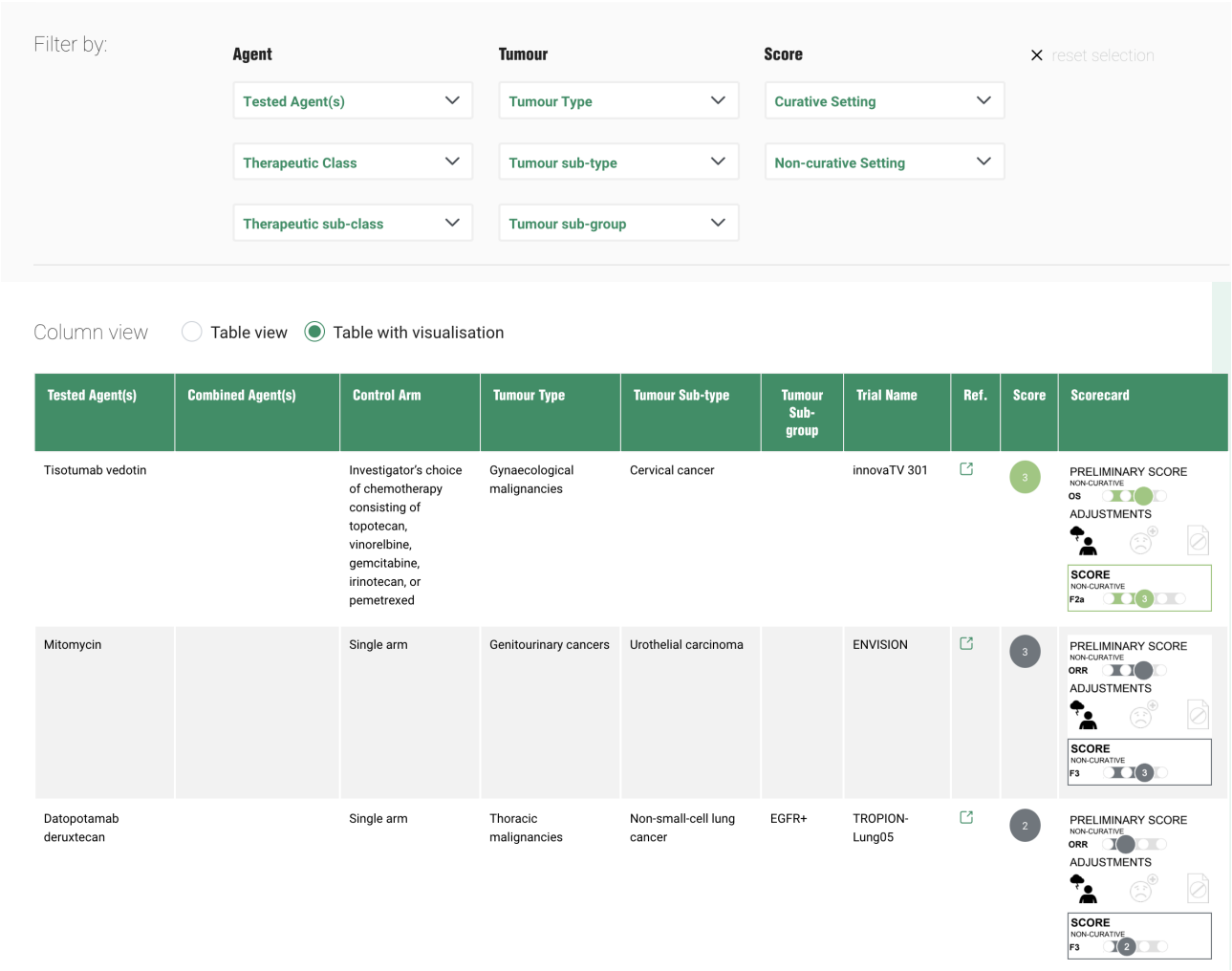
Each score is color-coded to reflect the clinical setting and type of outcome evaluated.

ESMO-MCBS for solid tumours

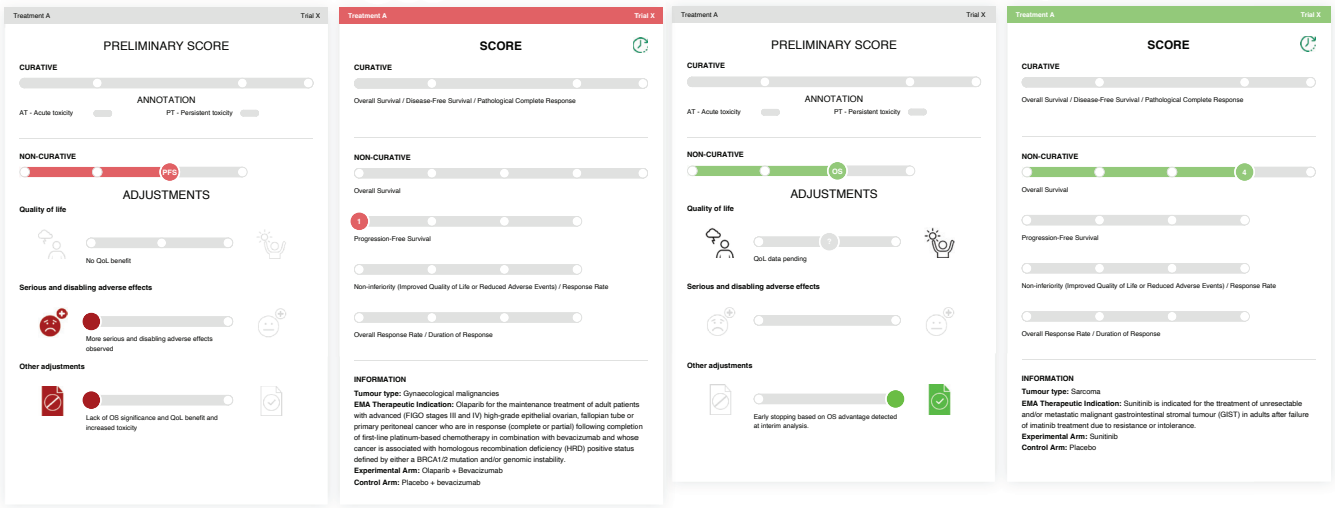
- **Curative setting** – evaluated outcomes include DFS, OS, or pCR (from comparative or single-arm studies)
- **Non-curative setting** – evaluated outcome OS (from comparative studies)
- **Non-curative setting** – evaluated outcome PFS (from comparative studies)
- **Non-curative setting** – evaluated outcomes include RR, QoL, or non-inferiority (from comparative studies)
- **Non-curative setting** – evaluated outcomes include PFS or ORR (from single-arm studies in orphan diseases or high unmet need)

ESMO-MCBS:H

- **Curative setting** – evaluated outcomes include DFS, OS, or pCR (from comparative or single-arm studies)
- **Non-curative setting** – evaluated outcome OS (from comparative studies)
- **Non-curative setting** – evaluated outcome PFS (from comparative studies)
- **Non-curative setting** – evaluated outcomes include MMR, RR, QoL, or non-inferiority (from comparative studies)
- **Non-curative setting** – evaluated outcomes include PFS or ORR (from single-arm studies in orphan diseases or high unmet need)



Each Scorecard is accompanied by a visualisation of the score, which illustrates the factors contributing to the final score. It offers a visual understanding of the ESMO-MCBS scores by enhancing user-friendliness and understandability. Two examples are illustrated below.



How to score a treatment before regulatory approval

When a treatment needs to be scored before regulatory approval, or if it has not yet been evaluated by ESMO, two complementary tools are available to support this assessment.

The **online tutorials** are an interactive learning tool to show, both in written and visual format, the instructions of each form individually and how to use the ESMO-MCBS.

The **scoring tool** is a user-friendly interactive tool to automatically generate ESMO-MCBS scores, to assist individuals to evaluate the clinical benefit of a novel treatment, including treatments before regulatory approval. The generated score, not validated by ESMO, can be downloaded in an image and can be used in presentations or approvals dossiers.

ESMO offers support to third parties wanting to use the scale. Please do not hesitate to contact us at **mcbs@esmo.org**

What is the potential use and accessibility of the ESMO-MCBS?

This structured and disciplined approach to deriving estimates of clinically meaningful benefit of cancer treatments from published data can be used in a range of settings, including:

Clinical decision making

The data enclosed in ESMO-MCBS scoring can help clinicians weigh the relative merits of competing relevant therapeutic options and may also be of benefit in explaining the relative merit of therapeutic options to patients and their families. This information may be especially helpful when treatments incorporate substantial out-of-pocket costs.

Formulation of clinical guidelines

For cancer therapies, the ESMO-MCBS scale provides a clear, well-structured and validated mechanism to indicate the magnitude of clinical benefit, in addition to the level of evidence, that can inform both national and international guidelines.

Clinical trial design

The ESMO-MCBS can support the design of clinical trials by guiding researchers toward endpoints that reflect meaningful clinical benefit, such as overall survival, quality of life, and toxicity. By aligning trial objectives with ESMO-MCBS criteria, it helps ensure that studies generate data with real-world relevance. Additionally, the ESMO-MCBS can help reduce bias in trial design by encouraging the use of appropriate comparators, relevant patient populations, and transparent reporting, ultimately leading to more robust and patient-centred evidence.

Public policy applications

Grading derived from the ESMO-MCBS provides a backbone for value evaluations of cancer medicines and can help public policy-makers in the advancement of ‘accountability for reasonableness’ in resource allocation deliberations. It is being used as part of HTA processes in a growing number of countries.

Education

The ESMO-MCBS is a powerful tool to teach a disciplined and validated approach to data interpretation. It is especially valuable for oncologists in training and for application in journal club discussion.

Medical journalism

The ESMO-MCBS scores can help medical journalists correctly contextualise the importance of new therapies and to avoid hype in their reporting.

How is the ESMO-MCBS being used?

Since its development, the ESMO-MCBS has gained broad recognition and practical application across multiple domains in oncology and across the world. Its structured, evidence-based approach to evaluating clinical benefit of cancer medicines has made it a valuable tool in clinical practice, policy-making, education, and global health initiatives.

It is incorporated in the **ESMO Clinical Practice Guidelines** and the **Pan-Asian Adapted Guidelines**, helping to provide patients with the best care options and setting the highest standards for cancer care.

Since 2019, it has been **acknowledged by the World Health Organisation** as '**a screening tool to identify cancer treatments that have potential therapeutic value that warrants full evaluation for the Essential Medicines List (EML) listing**'[5]. Potential new EML cancer medicines, in general, should have a score on the ESMO-MCBS of A or B in the curative setting and of 4 or 5 in the non-curative setting.

It is being used **as part of Health Technology Assessment (HTA) processes** in a growing number of countries (see 'in focus' box below).

It is often **included in treatment applications dossier** to highlight to regulatory agencies or HTA body the clinical benefit of the new treatment.

It has been **presented inside and outside Europe** and in educational workshops for stakeholders, patient (advocates), pharma representatives and HTA bodies to increase knowledge sharing of the tool.

It being **used in oncology training programmes and journal club presentations**, modelling a structured approach to data interpretation in the evaluation of clinical benefit.

[5] World Health Organisation. Executive Summary. The Selection and Use of Essential Medicines 2019. Report of the 22nd WHO Expert Committee on the Selection and Use of Essential Medicines, 1-5 April 2019

IN FOCUS

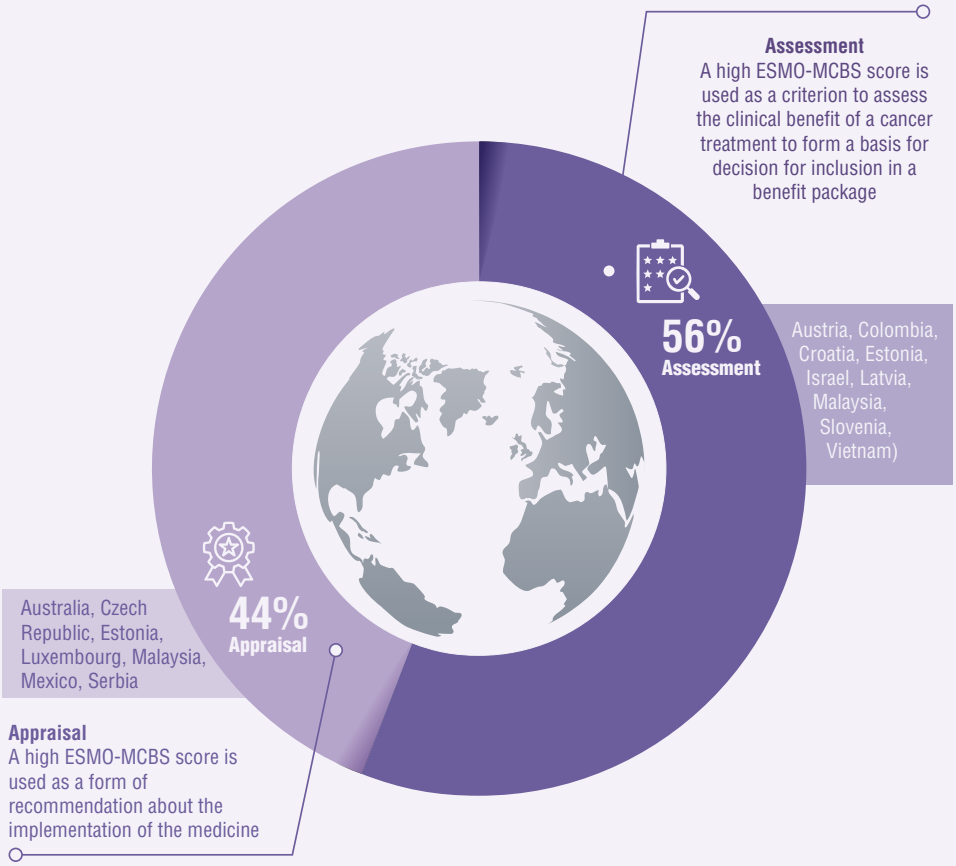
Use of the ESMO-MCBS in HTA

In 2024, ESMO surveyed the representatives of the ESMO **National Societies (NS)** to assess awareness, use, and the role of the ESMO-MCBS in healthcare decision-making.

73
oncology societies were invited

51
have completed the survey

16
societies have affirmed that the ESMO-MCBS is used in their country to support healthcare decision-making



Additionally, of the 19 EU27 survey countries, 15 (**79%**) agreed that the ESMO-MCBS could **support the prioritisation** of treatments for evaluation in the new **EU HTA Joint Clinical Assessment** processes because it is an **evidence-based tool**. This indicates that the ESMO-MCBS already plays a role in the HTA processes of several countries and has the potential for increased engagement.

79%
agreed ESMO-MCBS could support the prioritisation of medicines in the new EU HTA Joint Clinical Assessment

ESMO-MCBS for Solid Tumours

ESMO-MCBS for Solid Tumours

ESMO-MCBS was developed as a validated and reproducible tool designed to assess the magnitude of clinical benefit from new cancer therapies across the full spectrum of solid tumours. It is intended to evolve through planned updates that address emerging needs and identified limitations. The revisions introduced in ESMO-MCBS v2.0 enhance the tool's accuracy, fairness, discriminatory capacity, and overall relevance within an evolving clinical trial landscape.

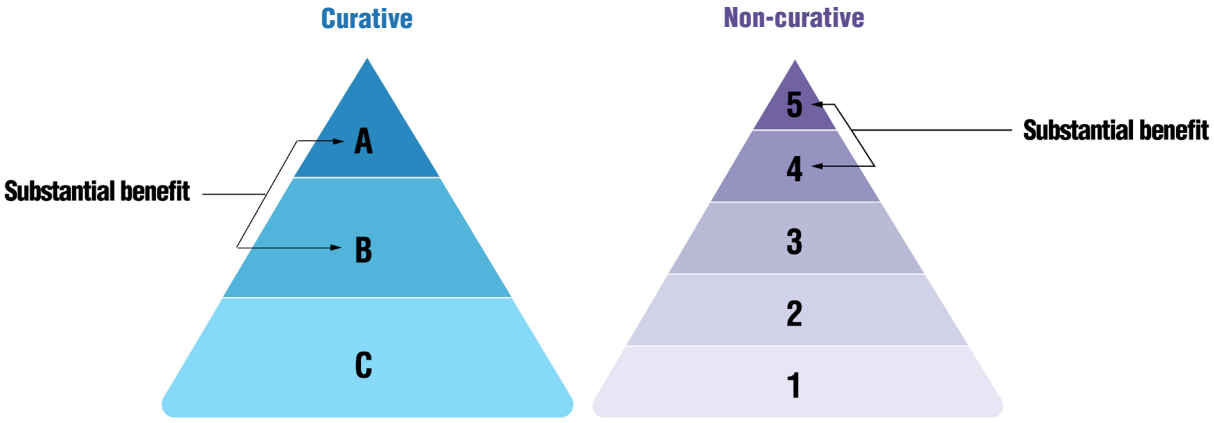
The scale considers overall survival, progression-free survival, disease free survival, hazard ratio, response rate, quality of life, prognosis of the condition and toxicity.

There are **6 evaluation forms**, in 2 settings (curative and non-curative) and various endpoints and a checklist to evaluate ESMO-MCBS score adjustments based on quality of life.

Setting	Endpoint/type of studies	Form	Scores
Curative	DFS, OS, pCR – Comparative studies (RCTs)	1a	A, B, C
Curative	DFS, OS – Single arm studies	1b	A, B, C
Non-curative	OS - Comparative studies (RCTs)	2a	5, 4, 3, 2, 1
Non-curative	PFS - Comparative studies (RCTs)	2b	4, 3, 2, 1
Non-curative	RR or QoL or non-inferiority studies - Comparative studies (RCTs)	2c	4, 3, 2, 1
Non-curative	PFS or ORR - Single-arm studies in "orphan diseases" and for diseases with "high unmet need"	3	4, 3, 2, 1

DFS, disease-free survival; ORR, overall response rate; OS, overall survival; pCR, pathological complete response/remission; PFS, progression-free survival; QoL, quality of life; RCTs, randomised controlled trials; RR, response rate.

The highest possible grades of the ESMO-MCBS are A in the curative setting, and 5 for non-curative indications (for the primary endpoint OS). Grades of A and B in the curative setting and 5 and 4 in the non-curative setting indicate substantial clinical benefit.



More details on the forms are reported at
www.esmo.org/guidelines/esmo-mcbs/esmo-mcbs-for-solid-tumours/esmo-mcbs-evaluation-forms

ESMO-MCBS for Haematological Malignancies

ESMO-MCBS for Haematological Malignancies (ESMO-MCBS:H)

ESMO-MCBS:H[4] was developed in collaboration with the European Hematology Association (EHA). It is based on ESMO-MCBS v2 with adjustments for haematological malignancies, and addresses shortcoming identified in field-testing using ESMO-MCBS v1.1.

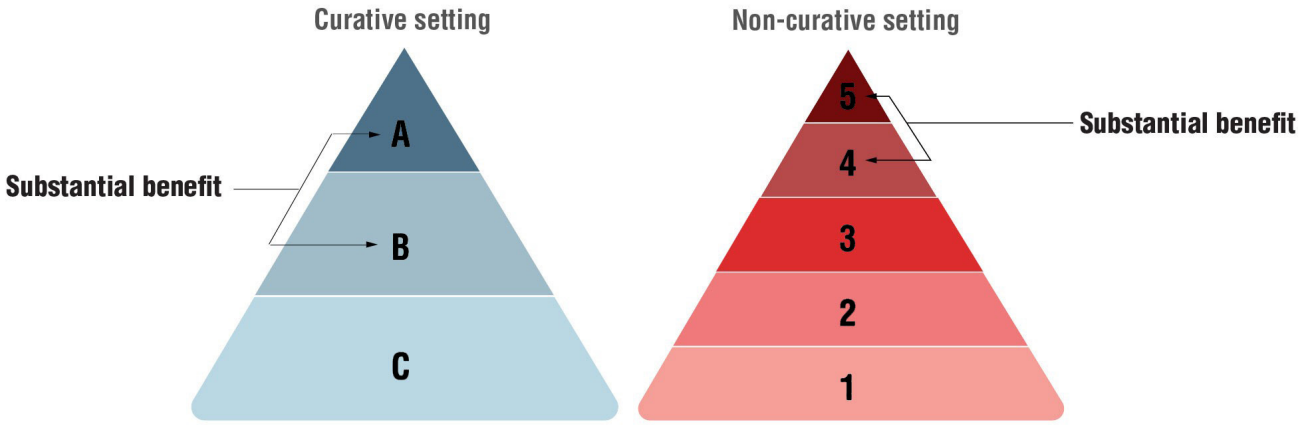
The scale considers overall survival, progression-free survival, disease free survival, hazard ratio, response rate, molecular response rate, quality of life, prognosis of the condition and toxicity.

There are **6 evaluation forms**, in 2 settings (curative and non-curative) and various endpoints.

Setting	Endpoint/type of studies	Form	Scores
Curative	DFS, OS, pCR – Comparative studies (RCTs)	1a	A, B, C
Curative	DFS, OS – Single arm studies	1b	A, B, C
Non-curative	OS - Comparative studies (RCTs)	2a	5, 4, 3, 2, 1
Non-curative	PFS - Comparative studies (RCTs)	2b	4, 3, 2, 1
Non-curative	MMR, RR, toxicity or QoL and non-inferiority studies - Comparative studies (RCTs)	2c	5, 4, 3, 2, 1
Non-curative	PFS or ORR - Single-arm studies in “orphan diseases” and for diseases with “high unmet need”	3	5, 4, 3, 2, 1

DFS, disease-free survival; MMR, molecular response rate; ORR, overall response rate; OS, overall survival; pCR, pathological complete response/remission; PFS, progression-free survival; QoL, quality of life; RCTs, randomised controlled trials; RR, response rate.

The highest grades of the ESMO-MCBS:H in the curative setting are A and B and in the non-curative setting 5 and 4, which indicate a substantial magnitude of clinical benefit.



More details on the forms are reported at
www.esmo.org/guidelines/esmo-mcbs/esmo-mcbs-for-haematological-malignancies/esmo-mcbs-h-evaluation-forms

[4] Kiesewetter B, Dafni U, de Vries E et Al. ESMO-Magnitude of Clinical Benefit Scale for haematological malignancies (ESMO-MCBS:H) version 1.0. Ann Oncol2023:34:734-71et al. ESMO-Magnitude of Clinical Benefit Scale version 2.0 (ESMO-MCBS v2.0). Ann Oncol 2025;36,8: 866 - 908

What people are saying about the ESMO-MCBS

"The ESMO-Magnitude of Clinical Benefit Scale is an important and timely attempt to create a standardised, transparent, and clinically grounded tool for evaluating the benefits of cancer treatments."

"The ESMO framework offers a thoughtful, clinically relevant, and pragmatic attempt to define meaningful clinical benefit."

"The ESMO-MCBS has set a benchmark in oncology by offering a transparent and reproducible metric for judging the true value of anticancer treatments."

"The ESMO-MCBS represents a valuable initiative to move beyond regulatory approval toward an evidence-based assessment of clinical benefit that is directly relevant to patients and clinicians."

"The ESMO-MCBS is used as guidance for designing clinical trials and setting the targets."

"The ESMO-MCBS improves access times and financing of new treatments."

A tool to assist in the prioritisation of treatments in cancer care

Evidence-based standards for patient care

ESMO-MAGNITUDE OF CLINICAL BENEFIT SCALE

ESMO Scientific Affairs
c/o ESMO Head Office
Via Ginevra 4, 6900 Lugano,
Switzerland
Te. +41 (0)91 973 19 33
mcbs@esmo.org

For more information visit our website
www.esmo.org/Guidelines/ESMO-MCBS
or contact us at mcbs@esmo.org.